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An Annotated Bibliography of Weeds as Reservoirs for Organisms Affecting Crops

I. NEMATODES

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AN ANNOTATED BIBLIOGRAPHY OF WEEDS AS RESERVOIRS FOR ORGANISMS AFFECTING CROPS

I. Nematodes

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Introduction

Weeds reach into every dimension of the ecosystem. They strike at the health of man both directly and indirectly. They impact on the health of wild as well as domesticated animals. They interfere with all types of transportation--air, ground, and water. They restrict land and water utilization. And, in addition to the many other areas of impact, they strike a heavy blow in delimiting food and feed production. Not to be forgotten is the aesthetic aspect.

Weeds delimit production of food and feed crops by direct competition for abiotic factors required for growth--light, water, and mineral nutrients. The outcome of this competition is a function of the crop, the weeds, and the level of sophistication and timeliness of the farming operation. Extreme cases result in total crop failure. Regardless of the outcome, however, weeds are costly.

Weeds also delimit crop production indirectly by serving as reservoirs for organisms adversely affecting crops. Weeds serve as reservoirs by providing feed, shelter, and a reproductive site to maintain a population of an organism. These organisms include arthropods, nematodes, pathogens, and vertebrates. Many of these organisms themselves are devastating to crops, with the potential of reducing crop yield to zero. Their effects on crops are often more visible and alarming than is competition by weeds, even though their consequent effects on crop production may not be greater. Furthermore, given weed species may serve as a reservoir for more than one species adversely affecting crops, thus further compounding the problem.

The importance of weed control in crop production increases in an additive manner when the indirect aspects of weeds as reservoirs for organisms affecting crops, as well as the direct effects, are considered. The economics of preventing an outbreak of a disease or an insect by controlling a weed population, while at the same time eliminating competition by the weed with the crop, are very appealing. Control of the other species comes as a bonus to the reduction of competition by the weeds.

Johnsongrass (*Sorghum halepense* L.) may serve as an example to illustrate the direct and the indirect effects of a weed on a crop. Established populations of johnsongrass can offer such severe competition to maize (*Zea mays* L.) plantings that crop failure is complete. Control is difficult and costly. In Ohio, johnsongrass is the overwintering host of maize dwarf mosaic virus (MDMV) and of maize chlorotic

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dwarf virus (MCDV). It also hosts the several species of aphids which vector MDMV and the leafhopper vector (*Graminella nigrifrons*) of MCDV. Early season infection of maize by these viruses can reduce crop yield to zero. Johnsongrass also hosts a lesion nematode (*Pratylenchus* sp.) which parasitizes maize, causing economic losses in production.

This example of johnsongrass illustrates the multidisciplinary nature of weeds as reservoirs for organisms affecting crops, in addition to illustrating the direct and indirect effects of a weed on crop production. This one weed species, johnsongrass, hosts arthropods, nematodes, and pathogens which affect crop yields. Consider the multiple, far-reaching effects of controlling this one weed species--effects relating to crop yield and to the economics of crop production. In addition to these crop production aspects, effective johnsongrass control would affect programs of breeding for resistant crop varieties and programs on research aspects of the organisms hosted by johnsongrass. The importance of johnsongrass control is unquestionable, especially for those who have to contend with it. Perception of this multidisciplinary problem requires an integration of information.

The trend in research and teaching has been in the direction of increased specialization. This specialization has departmentalized the aspects of crop production, leaving a void regarding generalization or integration which gives relevance to the specialized information. Perception of the role of weeds as reservoirs for organisms affecting crops has been neglected in research and teaching during this age of specialization, but in the field the web of relationships among organisms has continued, unaffected by administrative departmentalization and academic classification.

The objectives of this research were: 1) to find and bring together the literature relating to this neglected aspect of crop protection and crop production; 2) to illustrate and emphasize the role of weeds as reservoirs for organisms affecting crops and crop production; 3) to emphasize the multidisciplinarity of crop protection in crop production; 4) to afford a readily available source of ideas for research in this neglected aspect of crop protection; 5) to emphasize the key role of weeds and their control in crop production; and 6) to illustrate the important indirect effect of weeds in delimiting crop production.

Literature searches have been undertaken of weeds reported to be serving as reservoirs for organisms affecting crops. The results of these searches are being published as separate annotated bibliographies relating to specific groups of organisms--arthropods, nematodes, pathogens, etc. The original intent was to include those research reports which identified specific weeds as hosts for specific organisms of economic significance in the production of specific crops.

Literature searches may have missed reports which should have been included. If so, the authors request that these omitted references be brought to their attention.

It is hoped that this work will serve as a fruitful resource for subjects of multidisciplinary research to increase crop production and that it will stimulate further research into the role of weeds as reservoirs for organisms affecting crops.

The multidisciplinarity of this work may have increased significance also in view of current concerns regarding vegetation management and monoculture vis-a-vis multiple cropping systems of farming. These matters are of current interest because of the perceived urgency to increase food production and because of environmental

concerns. Further consideration of the interrelationships of organisms--crop, weed, pathogen, nematode, arthropod--may expectantly bring increased relevance to the decision making process.

The bulk of the literature included in this section on plant parasitic nematodes was found as research reports cited in the Helminthological Abstracts, Volumes 1 (1932) through 46 (1977). Original sources of all available reports were reviewed. The research reports of special interest were those which identified a specific weed species as the host of a specific species of nematode which parasitized a specific crop species.

More than 25 families of plants were represented by the weeds reportedly serving as reservoirs for nematodes affecting crops adversely. Weed species classified among the compositae and graminae families were most numerous. Next most numerous were weed species classified among the cruciferae, cyperaceae, scrophulariaceae, leguminosae, polygonaceae, chenopodiaceae, and amaranthaceae families.

It might be concluded from the results of this literature search that much more research is needed on weeds as reservoirs for nematodes affecting crops. It is hoped that this literature compilation will stimulate interest and be of assistance in directing research activities along that vein.

The entries are listed alphabetically by author. The format of the entry is: author, year, title, and source, followed by specific data. The index includes an alphabetical listing of authors and organisms, with notations referring to all relevant entries.

Bibliography

Alalikiria, N. M. 1969. Nematodes of weeds of spring wheat in the Kirov region. Mater. Nauchn. Konf. Vses. O. Gel'mintol., Part I, pp. 14-19. (1)

Altman, J. 1968. The sugar beet nematode. Down to Earth, 23(4):27-31. (2)

Heterodera schachtii was reported on the following weed species:

Amaranthus retroflexus
Atriplex spp.
Brassica spp.
Chenopodium spp.
Portulaca oleracea
Solanum nigrum

Anonymous. 1944. Golden nematode of potato--cooperative survey, 1944. Bur. Entomol. and Plant Quarantine, U.S. Dept. Agr., 20 pp. (3)

A survey in 1944 of 1,480 potato-growing areas in 19 northern states, eastwards to North Dakota, to find distribution of the species of *Heterodera*. *Heterodera marioni* was found to have a wide distribution. *Heterodera schachtii* was found in *Polygonum* sp.

Anonymous. 1946. Entomology. Fla. Agri. Exp. Sta. Rep., 1945-46, pp. 61-64. (4)

J. R. Watson and H. E. Bratley prepared a press bulletin with a list of 25 species of weeds found to be infected with *Heterodera marioni* in fields in 3-year tobacco rotation. List is not included in report.

Anonymous. 1946. Root knot nematode. Tob. Res. Board Bull., Rhodesia, pp. 39-82. (5)

Discussion on the effects of agronomic factors on the yield and infestation with *Heterodera marioni* of tobacco of the variety Bonanza. Practices include weed fallow used in rotation. Native weed hosts are listed.

Anonymous. 1952. Narcissus pests. Minist. Agr., Fish., and Food, London, Bull. 51, 36 pp. (6)

Bulletin on the biology, symptoms produced, extent of damage, and alternative native host plants and weeds of *Ditylenchus dipsaci*, a pest of narcissus. There are sections on *Aphelenchoides subtenuis* and *Pratylenchus pratensis*, both nematode pests of narcissus.

Anonymous. 1952. Plant science. Rep. Sci. Serv. Dept. Agr., Canada, 1951-1952, pp. 10-33. (7)

The weeds *Chenopodium hybridum* and *Capsella bursa-pastoris* are reported as new hosts for the sugar-beet nematode, *Heterodera schachtii*.

Anonymous. 1968. Potato tuber eelworm. Minist. Agr., Fish., and Food, London, Adv. Leaflet 372 (revised), 4 pp. (8)

Mentha arvensis is the chief weed host of potato tuber eelworm (*Ditylenchus destructor*) in Britain, although *Sonchus arvensis* is also important. Other weed hosts are *Tussilago farfara, Bellis perennis, Rumex obtusifolius,* and *Plantago major*.

Anonymous. 1968. Stem eelworm on cereals and other farm crops. Minist. Agr., Fish., and Food, London, Adv. Leaflet, 6 pp. (9)

The oat race of the stem eelworm (*Ditylenchus dipsaci*) can infest *Stellaria media, Cerastium vulgatum, Galium aparine,* and *Avena fatua*. They act as alternate hosts.

Anonymous. 1972. East Malling Research Sta., Annu. Rep., 1971. United Kingdom, 190 pp. (10)

The hop strain of arabis mosaic virus (AMV) was transmitted experimentally by *Xiphinema diversicaudatum* to hops and herbaceous plants. Several weeds shown to be susceptible to AMV and also good hosts of *Xiphinema diversicaudatum* are potentially important in the ecology of nettlehead disease.

Ayoub, S. M. 1961. *Pratylenchus zeae* found on corn, milo, and three suspected new hosts in California. Plant Dis. Rep., 45:940. (11)

New hosts of *Pratylenchus zeae* were found in nematode infested milo fields. They were *Cynodon dactylon, Tribulus terrestris,* and *Echinochloa crus-galli*.

Baker, A. D. 1945. Additional Canadian host records for *Heterodera schachtii* Schm. and for *Heterodera marioni* (Cornu) Goodey. Can. Entomol., 76(7):152. (12)

Found considerable numbers of cysts of *Heterodera schachtii* on *Rumex crispus* L. near Sarnia, Ontario.

Arctium minus
Rumex crispus
Heterodera marioni
Heterodera schachtii

Barker, K. R. and J. N. Sasser. 1959. Biology and control of the stem nematode *Ditylenchus dipsaci*. Phytopathol., 49:664-670. (13)

New hosts of *Ditylenchus dipsaci* recorded in North Carolina:

Allium vineale
Erigeron annuus
Lamium purpureum
Ranunculus abortivus
Stellaria media
Taraxacum officinale
Veronica arvensis
Veronica peregrina

Barnes, R. F. and S. R. Gowen. Root-knot nematodes in Trinidad. *In*: Peachey, J. E. (ed.), Nematodes of tropical crops, Tech. Commun. Commonw. Bur. Helminthol., 40: 155-161. (14)

Lists are given of weeds and crops shown to be hosts of *Meloidogyne* sp., *Meloidogyne incognita, Meloidogyne javanica,* and *Meloidogyne exigua* in Trinidad.

Bates, G. H. 1945. An alien weed host of *Heterodera rostochiensis* in England. J. Helminthol., 21:104. (15)

Solanum sarachoides, the seeds of which are found among imported carrot seed, has become a problem in gardening districts in Staffordshire. Experimental pots became heavily infected with cysts of the potato root eelworm, *Heterodera rostochiensis*.

Birchfield, W. 1973. Pathogenesis and host-parasite relations of the cyst nematode, *Heterodera graminophila*, on grasses. Phytopathol., 63:38-40. (16)

Heterodera graminophila was hosted by *Echinochloa colonum* and *Sorghum halepense*.

Birchfield, W. 1954. The reproduction of *Tylenchorhynchus* sp. from sugarcane soils on different plants. Proc., Assoc. S. Agri. Workers, pp. 152-153. (17)

An unnamed *Tylenchorhynchus* sp. reported as the cause of a stubby and depleted root system of sugar cane was inoculated into various plants. Populations were estimated 110 days later. *Sorghum halepense* was infected.

Birchfield, W. and W. J. Martin. 1956. Pathogenicity on sugarcane and host plant studies of a species of *Tylenchorhynchus*. Phytopathol., 46:277-280. (18)

Host plant studies showed that the weed *Sorghum halepense* hosted *Tylenchorhynchus martini*.

Bird, G. W. and C. Högger. 1973. Nutsedges as hosts of plant parasitic nematodes in Georgia cotton fields. Plant Dis. Rep., 57:402. (19)

Yearly use of herbicides in cotton has increased populations of nutsedges which seem to coincide with nematode infestations in cotton. *Cyperus esculentus* hosted *Hoplolaimus columbus* and *Cyperus rotundus* hosted *Meloidogyne incognita*.

Brande, J. Van den and J. van Onsem. 1947. Het stengelaaltje *Ditylenchus dipsaci* van de rogge. Meded. Landbouwhogesch. Opzoekingsstn., Gent., 12:213-233. (20)

Dispersal of *Anguillulina dipsaci* by weeds acting as reservoirs was investigated. *A. dipsaci* was reported as responsible for a stem disease of rye.

Bratley, H. E. 1946. Weeds as a factor in the control of root-knot in tobacco fields. Fla. Agri. Exp. Sta., Bull. 629, 4 pp. (21)

Report on the occurrence of root-knot, due to *Heterodera marioni*, on the roots of weeds on plots lying fallow for 2 years after cropping with tobacco for 1 year. Of the 107 weed species examined, 25 were found to be susceptible. Hosts are listed.

Brooks, T. L. 1955. Additional hosts of the burrowing nematode in Florida. Plant Dis. Rep., 39:309. (22)

The following new hosts of *Radopholus similis* were found under field conditions:

Celosia nitida
Desmodium sp.
Psidium guajava
Pyrostegia venusta
Rivina humilis
Solanum nigrum
Solanum seaforthianum
Urena lobata

Brown, E. B. 1954. Resistenta, an eelworm resistant clover. Plant Pathol., London, 3:122. (23)

Ditylenchus dipsaci was found on wild white clover (*Trifolium repens*) in Cambridge in 1949 and on a field crop in Lincolnshire in the same year.

Brown, E. B. 1956. Damage to henbane by stem eelworms, *Ditylenchus dipsaci* (Kühn, 1857) Filipjev, 1936. J. Helminthol., 30:143-144. (24)

The first report of *Ditylenchus dipsaci* on *Hyoscyamus niger* from Long Melford, Suffolk.

Burckhart, F. 1967. (The occurrence of leaf eelworm on weeds and other wild plants.) Mitt. Biol. Bundesanst. Land. Forstwirtsch., Berl.-Dahlem., 121:71-75. (25)

Survival and spread of the leaf eelworms *Aphelenchoides fragariae* and *Aphelenchoides ritzemabosi* with reference to weed hosts.

Aphelenchoides ritzemabosi was hosted by:

Bellis perennis
Capsella bursa-pastoris
Chenopodium album
Convolvulus sp.
Galium aparine
Lamium album
Lamium purpureum
Plantago major
Senecio vulgaris
Solanum nigrum
Sonchus arvensis
Sonchus oleraceus
Stellaria media
Taraxacum officinalis
Urtica dioica
Urtica urens

Aphelenchoides fragariae was hosted by:

Glechoma hederacea
Senecio nemorensis
Stachys-Arten alopecurus
Stachys-Arten officinalis
Stachys-Arten palustris

Caveness, F. E. 1967. Shadehouse host ranges of some Nigerian nematodes. Plant Dis. Rep., 51:33-37. (26)

Tables 1 and 2 list 84 species of plants (including crop and weed species) which are hosts for one or more of 30 nematode species.

Chitwood, B. B. and W. Birchfield. 1957. Citrus-root nematode, a native to Florida soils. Plant Dis. Rep., 41:525. (27)

The citrus-root nematode, *Tylenchulus semi-penetrans*, was found on a new host, climbing hempweed (*Mikania batatifolia*), in Florida.

Clayton, E. E., K. J. Shaw, T. E. Smith, J. G. Gaines, and T. W. Graham. 1944. Tobacco disease control by crop rotation. Phytopathol., 34:870-883. (28)

Results of effects of rotations on root-knot disease in tobacco. *Digitaria* sp. contamination in a rotation following oats nullified the oats' ability to reduce crop infestation by *Heterodera marioni*.

Cobb, G. S., G. Steiner, and F. S. Blanton. 1934. Observations on the significance of weeds as carriers of the bulb or stem nematode in narcissus plantings. Plant Dis. Rep., 18:127-129. (29)

The bulb nematode, *Anguillilina dipsaci*, was found infecting 29 species of weeds. Among them are 21 plants not previously reported as hosts.

Agropyron repens
Ambrosia elatior
Chenopodium album
Chrysanthemum leucanthenum
Digitaria sanguinalis

Erechtites hieracifolia
Erigeron canadensis
Fagopyrum vulgare
Galinsoga parviflora
Lactuca canadensis

Lepidium virginicum
Linaria canadensis
Linaria vulgaris
Mollugo verticillata
Oxalis stricta
Phleum pratense
Plantago lancelata
Plantago rugelli
Polygonum aviculare
Polygonum convolvulus

Polygonum persicaria
Prunus sp.
Raphanus raphanistrum
Rumex acetosella
Rumex crispus

Rumex obtusifolius
Soja max
Trifolium arvense
Trifolium repens

Colbran, R. C. 1954. Problems in tree replacement. II. The effect of certain methods of management on the nematode fauna of an orchard soil. J. Australian Inst. Agri. Sci., 20:234-237. (30)

Populations of the nematode *Pratylenchus coffeae* were maintained in a soil, once occupied by host apple trees, by allowing weeds, especially *Rumex acetosella*, to grow.

Colbran, R. C. 1956. Root-knot nematodes and their control. J. Queensl. Agr., 82:219-223. (31)

A discussion on the life history of *Meloidogyne* spp. and control measures, including prevention of the growth of susceptible weeds.

Collins, J. C. 1938. Tobacco eelworm (*Heterodera marioni*). Report on farmers' replies to questionnaire. Rhodesia Agri. J., 35:264-278. (32)

Heterodera marioni is widespread in the tobacco growing areas of southern Rhodesia and has spread rapidly. Infestation was thought to arise from infected river water, indigenous weed hosts, and infected garden refuse.

Conover, R. A. and D. O. Wolfenbarger. 1950. Studies on the control of the root-knot nematode on marl soils. Fla. Agri. Exp. Sta. Rep., 1949-50, pp. 248-249. (33)

Applying herbicides to destroy the weed host *Colocasia esculenta* was more efficacious than pulling the host when systems of control of root-knot nematode were compared.

Cooper, J. I. and B. D. Harrison. 1973. The role of weed hosts and the distribution and activity of vector nematodes in the ecology of tobacco rattle virus. Ann. Appl. Biol., 73:53-66. (34)

Nineteen weeds were found infected by tobacco rattle virus (TRV) at a site in Eastern Scotland. TRV can be seed-borne in *Viola arvensis* and *Stellaria media*. *Trichodorus* spp. are the vectors of TRV. *Trichodorus* spp. feed on potatoes,

infecting them more frequently with TRV when the crop was kept weed free. Potatoes were infected more when other hosts were not available.

Achillea millefolium
Agropyron repens
Anchusa arvensis
Chenopodium album
Cirsium arvense
Festuca rubra
Galeopsis tetrahit
Hieracium sp.
Matricaria sp.
Poa annua
Polygonum aviculare
Polygonum convolvulus
Rumex acetosella
Sagina procumbens
Senecio vulgaris
Spergula arvensis
Stellaria media
Urtica urens
Viola arvensis

Courtney, W. D. 1952. The teasel nematode, *Ditylenchus dipsaci* (Kühn, 1857) Filipjev, 1936. J. Wash. Acad. Sci., 42:303-309. (35)

The teasel nematode infests and reproduces in spring and winter oats, rye, and spring and winter wheat. Studies in the Pacific Northwest showed that besides the weed *Dipsacus fullonum, Collomia gradiflora* can serve as a reservoir for the eelworm.

Crossman L. and J. R. Christie. 1937. Lists of plants attacked by miscellaneous plant-infesting nematodes. Plant Dis. Rep., 21:144-167. (36)

Included in the article were extensive lists of crop and weed hosts for *Anguillulina* spp., *Anguina* spp., *Ditylenchus* spp., *Rotylenchus* spp., *Tylenchus* spp., *Pratylenchus* spp., and others. The following weeds were included:

Achillea millefolium
Agropyron repens
Amaranthus retroflexus
Atriplex sp.
Avena fatua
Brassica sp.
Carduus spp.
Carex spp.
Chenopodium album
Cichorium intybus
Cirsium spp.
Crepis spp.
Cyperus rotundus
Dipsacus silvestris
Ficus sp.
Helianthus annuus
Hordeum jubatum
Koeleria cristata
Kochia prostrata
Papaver rhoeas
Plantago spp.
Poa spp.
Ranunculus spp.
Rumex acetosa
Rumex crispus
Setaria viridis
Solidago spp.
Sonchus asper
Taraxacum officinale

Cunningham, H. S. and W. F. Mai. 1947. Nematodes parasitic on the Irish potato. Cornell Ext. Bull 712, 24 pp. (37)

A short account is given of the nematode *Heterodera rostochiensis*, a parasite on potatoes in New York State. It sometimes occurs on the roots of *Polygonum* spp. in potato fields.

Daulton, R. A. C. 1955. Progress report on eelworm control experiments. Rhodesian Tob., 11:21-24. (38)

Davidson, T. R. and J. L. Townshend. 1967. Some weed hosts of the southern root knot nematode, *Meloidogyne incognita*. Nematologica, 13:452-458. (39)

Greenhouse studies conducted in Ontario showed the following 34 species of weeds to be hosts of *Meloidogyne incognita:*

Amaranthus retroflexus
Anthemis cotula
Arenaria serpyllifolia
Barbarea vulgaris
Bromus secalinus
Bromus tectorum
Capsella bursa-pastoris
Cerastium vulgatum
Chenopodium album
Chrysanthemum leucanthemum
Cynoglossum officinale
Daucus carota
Descurainia sophia
Epilobium sp.
Euphorbia supina
Hordeum jubatum
Hypericum punctatum
Lamium amplexicacile
Leonurus cardiaca
Malva neglecta
Medicago lupulina
Nepeta cataria
Oxalis europaea
Polygonum persicaria
Potentilla norvegica
Prunella vulgaris
Rumex crispus
Setaria viridis
Sisymbrium altissimum
Solanum dulcamara
Stellaria media
Thlaspi arvense
Veronica peregrina
Veronica serpyllifolia

Dore, W. G. 1942. Nematode infection in poa. Rhodora, 44:246-247. (40)

Anguillula agrostis in *Poa costata* in Nova Scotia has led the author to believe that *Poa costata* may only be a nematode infected *Poa pratensis*. He contends the plant was misnamed on the basis of nematode infection and symptoms of florets.

Dorst, H. H. M. van and H. A. van Hoff. 1965. Arabismozaiek virus bij Komkommer in Nederland. Neth. J. Plant Pathol., 71:176-179. (41)

Xiphinema diversicaudatum was recovered in Holland from soil containing cucumbers infected with arabis-mosaic virus. The soil was found to be the source of the virus. Tracing the soil back to its origin, 22 weed species were found in the vicinity to be hosts of the virus.

Duggan, J. J. and J. F. Moore. 1962. Host-range of the tuber rot eelworm (*Ditylenchus destructor*). Irish J. Agri. Res., 1:109-114. (42)

Weeds growing in the field and in pot tests revealed the following as new host records for *Ditylenchus destructor:*

Bellis perennis
Rumex obtusifolius
Sonchus asper
Tussilago farfara

Dunning, R. A. 1954. Beet stem eelworm. Plant Pathol., London, 3:133-134. (43)

In an artificially infested plot, the weeds *Stellaria media* and *Atriplex patula* were found to be hosts to *Ditylenchus dipsaci*.

Edwards, D. I. and D. P. Taylor. 1964. Host range of an Illinois population of the stem nematode (*Ditylenchus dipsaci*) isolated from onion. Nematologica, 9:305-312. (44)

Tests for possible hosts of *Ditylenchus dipsaci* included the following crop plants: soybean, snapbean, and pea. Weed hosts included:

Brassica nigra
Hibiscus trionum
Pastinaca sativa
Polygonum pennsylvanicum
Polygonum persicaria
Rumex crispus
Saponaria officinalis
Solanum carolinense
Solanum nigrum

Edwards, E. T. 1932. Stem nematode disease of lucerne, with review of literature concerning the causal organism *Tylenchus dipsaci* (Kühn). Bast. Agri. Gaz., New South Wales, pp. 305-314, 345-356. (45)

The author suggests burning of refuse, exclusive of clovers, trefoils, and susceptible weeds from headlands, and rotation of immune crops to control the nematode. The nema is carried internally in the seed of *Taraxacum officinale* and *Hypochaeris radicata*. It has also been reported on *Medicago denticulata, Medicago minima,* and *Bromus unioloides*.

Egunjobi, Olufunke A. 1974. Nematodes and maize growth in Nigeria. I. Population dynamics of *Pratylenchus brachyurus* in and about the roots of maize and its effects on maize production at Ibadan. Nematologica, 20:181-186. (46)

Nematode populations were significantly lower in soil under weeds than soil under maize plants. However, the low nematode populations were consistently found under the weed plants, indicating they can be sustained by weeds. The following weeds were listed as hosts:

Ageratum conyzoides
Hibiscus esculentus
Indigofera hirsuta
Pueraria phaseoloides
Spigelia anthelmia
Talinum triangulare
Tridax procumbes

Ellenby, C. 1954. Tuber forming species and varieties of the genus *Solanum* tested for resistance to the potato root eelworm *Heterodera rostochiensis* Wollenweber. Euphytica, 3:195-202. (47)

Fassuliotis, G. 1974. Host range of the Columbia lance nematode, *Hoplolaimus columbus*. Plant Dis. Rep., 58:1000-1002. (48)

Hoplolaimus columbus was found on seven weed species, notably *Crotalaria spectabilis* and *Vigna unguiculata*. These findings were from field surveys at Holly Hill, S. C.

Faulkner, L. R. and F. D. McElroy. 1964. Host range of northern root knot nematode on irrigated crop plants and weeds in Washington. Plant Dis. Rep., 48:190-193. (49)

Meloidogyne hapla is widespread throughout the irrigated regions of Washington. From an economic standpoint, potato, sugar beet, and carrot are the most severely affected crop plants. It also attacks alfalfa, red clover, field pea, and peppermint. The following weeds were found to be infected in greenhouse studies:

Amaranthus graecizans
Apocynum androsaemifolium
Asclepias syriaca

Avena fatua
Centaurea repens
Chenopodium album

Convolvulus arensis
Crotalaria spectabilis
Iva santhifolia
Lotus americanus
Malva moschata
Mentha cardiaca

Mentha piperita
Sisymbrium officinale
Taraxacum officinale

Trifolium fragiferum
Vicia sativa

Feldmesser, J., W. A. Feder, and J. A. Pinckard. 1956. The occurrence of *Pratylenchus* spp. in Florida soils. Abstr., Phytopathol., 46:11. (50)

Hosts mentioned in the abstract include a number of weeds.

Fluiter, H. J. De and J. J. Mulholland. 1941. Gegevens Verkregen bij het anderzoek naar de waardplanten van *Tylenchus coffeae*. Bergcultures, 15:1588-1593. (51)

Contained the results of an investigation to determine the host plants of *Tylenchus coffeae* (*Anguillulina pratensis*) in Java. Host weeds were listed.

Franklin M. T. 1970. Interrelationships of nematodes, weeds, herbicides, and crops. Proc., 10th British Weed Control Conf., pp. 927-933. (52)

Franklin, M. T. 1951. The cyst-forming species of *Heterodera*. Tech. Commun., Commonwealth Bur. Agri. Parasitol. (Helminthol.), St. Albans, 147 pp. (53)

The role of weeds as reservoirs and the chemical, biological, and cultural measures for the control of eight cyst-forming species of the eelworm genus *Heterodera*.

Gahan, W. 1955. Root eelworm of sugar beet. Beet Grower, Dublin, 8:184-189. (54)

A discussion of the life history and mode of spread of *Heterodera schachtii* on crops in Ireland with a review of preventive and control measures. Common weeds acting as reservoirs for the nematode are mentioned including *Rumex* spp., *Chenopodium album, Brassica kaber,* and *Stellaria media*.

Gaskin, T. A. 1958. Weed hosts of *Meloidogyne incognita* in Indiana. Plant Dis. Rep., 42:802-803. (55)

In tests for susceptibility to *Meloidogyne incognita* and *Meloidogyne incognita* var. *acrita*, 70 plants were found to be hosts. The following weeds were susceptible:

Abutilon theophrasti
Acalypha virginica
Allium canadense
Amaranthus albus
Amaranthus graecizans

Amaranthus retroflexus
Amaranthus spinosus
Ampelamus albidus
Apocynum cannabinum
Asclepias syriaca

Avena fatua
Brassica juncea
Capsella bursa-pastoris
Centaurea maculosa
Chenopodium album

Chenopodium ambrosioides
Cirsium arvense
Cirsium vulgare
Convolvulus sepium
Daucus carota

Digitaria sanguinalis
Echinochloa crusgalli
Eleusine indica
Erigeron canadensis
Euphorbia maculata

Euphorbia supina
Hibiscus trionum
Ipomoea hederacea
Ipomoea lacunosa
Ipomoea purpurea

Lactuca canadensis
Lactuca pulchella
Lactuca scariola
Leonurus cardiaca
Linaria vulgaris

Malva neglecta
Medicago lupulina
Muhlenbergia schreberi
Oxalis stricta
Panicum capillare

Pastinaca sativa
Physalis heterophylla
Phytolacca americana
Plantago lanceolata
Plantago rugeli

Polygonum aviculare
Polygonum coccineum
Polygonum convolvulus
Polygonum erectum
Polygonum pensylvanicum

Polygonum persicaria
Portulaca oleracea
Raphanus raphanistrum
Rumex acetosella
Rumex altissimus

Rumex crispus
Rumex obtusifolius
Sicyos angulata
Sisymbrium officinale
Solanum dulcamara

Solanum nigrum
Solanum rostratum
Sonchus arvensis
Sonchus oleraceus
Stellaria media

Taraxacum officinale
Tragopogon pratensis
Verbascum blattaria
Vernonia altissima
Xanthium pennsylvanicum

Gateva, S. and G. Penton. 1971. (Phytonematode fauna at different stages in two rice varieties and the fauna of rice field weeds.) Fauna de fitonematodos en diferentes etapas de dos variedades de arrozy fauna de amlas hierbas encontradas en el arrozal. Ing. Agron., 10:19. (56)

Examination of the rice field weeds *Eleusine, Andropogan, Digitaria,* and *Echinochloa* in Cuba revealed 24 species of nematodes; more than a quarter were parasites of rice. *Panagrolaimus zeae* was one of the most common found.

Gibbs, A. and B. Harrison. 1976. Plant virology. The principles. Edward Arnold, London. (57)

Contains a discussion on control of weeds which serve as reservoirs for nematode species capable of transmitting plant viruses.

Godfrey, G. H. 1935. Hitherto unreported hosts of the root-knot nematode. Plant Dis. Rep., 19:29-31. (58)

Listed 47 plants, all of which were newly recorded hosts of *Heterodera marioni*. All except one occurred as weeds in Hawaiian pineapple fields. They are as follows:

Acanthospermum xanthoides
Anagallis arvensis
Avena fatua
Bidens pilosa
Cassia occidentalis
Chaetochloa verticillata
Chloris gayana
Cleome gynandra
Commelina nudiflora
Crotalaria saltiana
Cynodon dactylon
Cyperus strigosus
Datura stramonium
Desmodium triflorum
Emilia sonchifolia
Euphorbia presslii
Gomphocarpus physocarpus
Graphalium luteo-album
Hydrocotyle asiatica
Ipomoea pes-caprae
Ipomoea tuberculata
Ipomoea turpethum
Kniphofia uvaria
Paederia foetida
Paspalum larranagai
Pennisetum purpureum
Phytolacca acinosa
Picridium tingitanum
Prosopis juliflora
Prunella vulgaris
Richardsonia scabra
Senecio heracifolia
Sida meyeniana
Silene gallica
Solanum aculeatissimum
Solanum nodiflorum
Stachys arvensis
Stachytarpheta dichotoma
Synedrella nodiflora
Syntherisma chinensis
Syntherisma pruriens
Syntherisma sanguinalis
Tithonia rotundifolia
Tricholaena rosea
Triumfetta rhomboidea
Verbena bonariensis
Xanthium canadense

Goffart, H. 1954. Gegenwarts fragen zum Rübennematoden problem. Zucker, 7:130-137. (59)

In Western Germany, *Stellaria media* is a noteworthy host of the sugar beet eelworm *Heterodera schachtii*.

Goffart, H. 1951. Uber die Verbreitung und Pathogenität des Wurzelgallennematoden (*Heterodera marioni*) in der Türkei. Z. Parasitenkd., 15:70-86. (60)

Listed are accounts of root-knot infection found on the crop plants and weeds in Turkey.

New weed hosts recorded are:

Chenopodium glaucum
Lappula sp.
Rumex crispus
Sisymbrium sophia
Xanthium spinosum

Goffart, H. 1949. Zur Taxonomie und Entstehung der *Heterodera*-Arten. Nachrichten. Biol. Z. Braunschweig, 1:38. (61)

Species of *Heterodera* which are now specialized parasites of agricultural crops arose by mutations from species occurring on weeds, such as those on *Psamma arenaria* and *Agrostis stolonifera*.

Golden, A. M. and T. Shafer. 1958. Differential response of *Heterodera schachtii* and sugar beet nematode to selections of *Chenopodium album*. Plant Dis. Rep., 42:184-187. (62)

Goodey, J. B. 1951. The potato tuber nematode *Ditylenchus destructor* Thorne, 1945; the cause of eelworm disease in bulbous iris. Ann. Appl. Biol., 38:79-90. (63)

Transfers of infestation have been reciprocally effected between potato, bulbous iris, *Mentha arvensis*, and *Sonchus arvensis*.

Goodey, T. 1947. On the stem eelworm, *Anguillulina dipsaci*, attacking oats, onions, field beans, parsnips, rhubarb, and certain weeds. J. Helminthol., 22:1-12. (64)

A. dipsaci attacks certain common weeds which serve as reservoirs in the absence of susceptible crops. These weeds are:

Anagallis arvensis
Arenaria serpyllifolia
Cerastium arvense
Cerastium vulgatum
Galium aparine
Polygonum convolvulus
Stellaria media

Goodey, T. 1936. Some applied biological aspects of problems relating to plant-parasitic nematodes. Ann. Appl. Biol., 23:203-230. (65)

The role of weeds as reservoirs for *Anguillulina dipsaci* and the occurrence of *Heterodera schachtii* are discussed. *Heterodera schachtii* may have occurred naturally on *Hordeum murinum* and *Bromus madritensis* and then later transferred to cultivated cereals.

Graham, T. W. 1951. Nematode root rot of tobacco and other plants. S. C. Agri. Exp. Sta., Bull. 390, 25 pp. (66)

Evidence was presented showing that *Pratylenchus leiocephalus* and *Pratylenchus zeae* can overwinter in dead roots of crabgrass (*Digitaria sanguinalis*).

Other infected weeds included:

Amaranthus spinosus
Ambrosia artemisifolia
Andropogon virginicus
Chenopodium album
Crotalaria spectabilis
Dactyloctenium aegyptium
Diodia teres
Eremochloa ophiuroides
Fragaria sp.
Heterotheca subaxillaris
Solidago gigantea
Xanthium pungens

Grujičič, G. 1972. The influence of the host plant upon the duration of the development cycle and number of generations of *Heterodera schachtii* Schmidt. Int. Symp. Nematol. (11th), Reading, U.K., Abstr. 25-26. (67)

Weed plants were tested for their influence on hatching and the life cycle of *Heterodera schacgtii*.

Hastings, R. J. and J. E. Bosher. 1952. The discovery of nematodes belonging to the genus *Heterodera* in British Columbia and their host relationships. Sci. Agr., 32:507-510. (68)

Heterodera was found in two locations in British Columbia on *Capsella bursa-pastoris, Erodium cicutarium, Trifolium dubium, Trifolium pratense, Trifolium repens,* and *Vicia* sp.

Heathcote, G. D. 1970. Weeds, herbicides, and plant virus diseases. Proc., 10th British Weed Control Conf., pp. 934-941. (69)

Seed-borne virus diseases; the viruses of perennial, annual, and overwintering weeds; the mode of spread of viruses from infected weeds and control; and the effect of herbicides on infected plants are reviewed.

Henderson, V. E. 1951. Some host relationships of the potato-root nematode, *Ditylenchus destructor*, Thorne, 1945. Nature (London), 167:952. (70)

Ditylenchus destructor was reported on several plant hosts on Prince Edward Island.

Allium cepa
Daucus carota
Linaria vulgaris
Plantago major
Sisyrinchium angustifolium
Solidago graminifolia
Taraxacum officinale
Trifolium hybridum
Trifolium pratense
Vicia sativa

Hesling, J. J. 1958. The efficiency of certain grasses as hosts of cereal root eelworm. Plant Pathol. (London), 7:141-143. (71)

Host grasses mentioned include:

Dactylis glomerata
Lolium italicum
Lolium perenne
Phleum pratense

Hodson, W. E. H. 1946. Narcissus pests. Minist. Agr., Fish., Food. (London), Bull. 51, 33 pp. (72)

Weeds infested with the stem and bulb eelworm are mentioned.

Högger, C. H. 1976. Plant parasitic nematodes associated with weeds and agronomic crops in Georgia. Diss. Abstr., Int. B. Sci. Eng., 36:3704-3705. (73)

A survey in Georgia showed *Hoplolaimus columbus, Meloidogyne incognita, Pratylenchus brachyurus,* and *Trichodorus* sp. were frequently associated with *Cyperus* spp. and *Sorghum halepense.* Population decline of *Trichodorus* spp. during overwintering was reduced by *Ambrosia artemisifolia* and *Lamium amplexicaule.*

Högger, C. H. and G. W. Bird. 1976. Weed and indicator hosts of plant-parasitic nematodes in Georgia cotton and soybean fields. Plant Dis. Rep., 60:223-226. (74)

Cyperus spp. and *Sorghum halepense* acted as overwintering indicator hosts and alternative summer hosts of *Meloidogyne incognita* and *Hoplolaimus columbus*, respectively. Tables were supplied of weed hosts of *Meloidogyne incognita*, *Hoplolaimus columbus*, *Pratylenchus brachyurus*, and *Trichodorus christiei* which included the following species:

Allium vineale
Amaranthus spinosus
Ambrosia artemisifolia
Campis radicans

Capsella bursa-pastoris
Cassia obtusifolia
Cassia occidentalis
Cerastium vulgatum

Chenopodium album
Cynodon dactylon
Cyperus spp.
Digitaria sanguinalis

Eleusine indica
Geranium carolinianum
Gnaphalium sp.
Lamium amplexicaule
Lepidium virginicum
Linaria canadensis

Physalis subglabrata
Richardia scabra
Rumex hastatulus
Sida spinosa

Sorghum halepense
Specularia perfoliata
Stellaria media
Vicia angustifolia

Vigna sinensis
Xanthium pennsylvanicum

Högger, C. H. and G. W. Bird. 1974. Weeds and covercrops as overwintering hosts of plant parasitic nematodes of soybean and cotton in Georgia. J. Nematol., 6:142-143. (75)

The following nematodes were found to be harbored on the following weeds during the winter in Georgia: *Meloidogyne incognita* on *Stellaria media, Sorghum halepense, Cyperus esculentus,* and *Cyperus rotundus*. *Hoplolaimus columbus* on *Lamium amplexicaule, Sorghum halepense, Cyperus esculentus,* and *Cyperus rotundus*.

Holdeman, Q. L. and T. W. Graham. 1953. Population trends of the sting nematode under different crops in greenhouse pot culture. Abstr., Phytopathol., 43: 291. (76)

Belonolaimus gracilis populations were increased or maintained on *Ambrosia* sp., *Xanthium pennsylvanicum, Cynodon dactylon,* and *Digitaria* sp.

Holdeman, Q. L. and T. W. Graham. 1953. The effect of different plant species on the population trends of the sting nematode. Plant Dis. Rep., 37:497-500 (77)

Belonolaimus gracilis, a serious pest of many crops in the southeastern U.S., can build up on certain weeds, especially *Digitaria sanguinalis*. Other host weeds are *Desmodium tortuosum, Cynodon dactylon, Paspalum dilatatum, Dactyloctenium aegyptium, Ambrosia artemisifolia*, and *Xanthium* sp.

Hollis, J. P. 1972. Competition between rice and weeds in nematode control tests. Phytopathol., 62:764. (78)

Criconemoides onoensis hosted by *Echinochloa colona, Cyperus* spp., and *Fuirena* sp. in Louisiana rice fields.

Hollis, J. P. 1972. Nematicide-weeds interaction in rice fields. Plant Dis. Rep., 56:420-424. (79)

In nematicide tests in Louisiana rice fields, the common rice weeds *Echinochloa colonum, Cyperus iria, Cyperus haspan, Cyperus articulatus,* and *Fuirena* sp. were hosts for the ring nematode *Criconemoides onoensis.*

Horne, C. W. and W. H. Thames, Jr. 1966. Notes on occurrence and distribution of *Heterodera punctata.* Plant Dis. Rep., 50:869-871. (80)

The cyst nematode *Heterodera punctata* was found at Cap Tourmente, Quebec, heavily infesting *Agrostis stolonifera.* The nematode was found in Texas in 1963 on *Poa annua.*

Hurst, R. R. 1947. The potato root nematode, *Ditylenchus destructor,* in P.E.I. Proc., Can. Phytopathol. Soc., 15:17 (81)

Ditylenchus destructor was found on farms on Prince Edward Island infecting *Mentha arvensis.*

Ichinohe, M. and I. Yuhara. 1956. Oecology of the root-knot nematode in the northern part of Hokkaido. Jpn. J. Ecology, 6:24-28. (82)

In Northern Hokkaido, *Meloidogyne hapla* was found on 46 species of weeds in 19 families from 13 localities. Sixteen are new host records. Some of the infected weeds are *Arctium minus, Helianthus maximiliani, Plantago major* var. *asiatica, Plantago lanceolata,* and *Taraxacum platycarpum.*

Ivanova, I. V. 1973. The infection rate of weeds with the nematode *Ditylenchus destructor.* Byull. Vses. Instit. Gel'mintol. K.I. Skryabina, 11:39-42. (83)

Ditylenchus destructor was found infecting 11 of 13 species of weeds tested in the Moscow region, USSR. *Solanum nigrum, Taraxacum officinale,* and *Barbarea vulgaris* were heavily infected. *Fumaria officinalis, B. vulgaris,* and *Matricaria inodora* were newly reported hosts.

Jensen, H. J. 1953. Experimental greenhouse host range studies of two root-lesion nematodes *Pratylenchus vulnus* and *Pratylenchus penetrans.* Plant Dis. Rep., 37: 384-387. (84)

Pratylenchus vulnus infected *Plantago lanceolata* and *Rumex* sp. in the greenhouse.

Johnson, L. R. 1936. A note on the occurrence of *Anguillulina dipsaci* (Kühn, 1858) on certain weeds including a new host record. J. Helminthol., 14:233-235. (85)

Stellaria media and *Galium aparine* growing in oat and bean crops in Yorkshire were shown to be attacked by *Anguillulina dipsaci. G. aparine* is a new host.

Johnson, L. R. 1939. Further observations on *Anguillulina dipsaci* in rhubarb. Ann. Appl. Biol., 26:739-749. (86)

Anguillulina dipsaci was associated with infection in rhubarb. It also attacked *Stellaria media*.

Johnson, L. R. 1940. On the stem and bulb eelworm (*Anguillulina dipsaci* Kühn) with special reference to its occurrence on weeds of arable land. Ann. Appl. Biol., 27:248-251. (87)

Anguillulina dipsaci is widespread in infection of *Galium aparine* and *Stellaria media* in oat fields. The nematode can persist on weeds and reinfect subsequent crops.

Johnson, L. R. and H. W. Thompson. 1937. Stem eelworm disease of field beans. J. Minist. Agr., London, 44:130-137. (88)

Galium aparine served as a reservoir for the oat strain of the stem eelworm, *Anguillulina dipsaci*.

Johnston, W. C. 1934. The occurrence of eelworms on the roots of certain grasses. J. Dept. Agr., South Australia, 37:705-706. (89)

Eelworm cysts were reported on the roots of *Bromus sterilis, Hordeum* sp., and *Phalaris canariensis*.

Johnstone, F. E., Jr. and R. B. Raynolds. 1954. Field experiments on control of root-knot and weeds with soil fumigants. Proc., Assoc. S. Agri. Workers, 51st Ann. Conv., pp. 127-128. (90)

Jones, F. G. W. 1945. Soil populations of beet eelworm (*Heterodera schachtii* Schm.) in relation to cropping. Ann. Appl. Biol., 32:351-380. (91)

Seventeen susceptible weeds which harbor cysts similar to those of beet eelworm are:

Atriplex patula
Brassica nigra
Brassica rapa

Capsella bursa-pastoris
Chenopodium album
Chenopodium polyspermum

Chenopodium rubrum
Cochlearia armoracia
Coronopus ruellii
Erysimum cheiranthoides
Galeopsis speciosa
Lepidium sativum

Polygonum persicaria
Rumex crispus
Sisymbrium officinale

Stellaria media
Thlaspi arvense

Jones, F. G. W. and F. R. Petherbridge. 1947. Beet eelworm. British Sugar Beet Rev., 15:139-142; 16:31-36. (92)

A list of weeds and crop plants attacked by the sugar-beet eelworm, *Heterodera schachtii*, in England and Wales is given.

Kasimova, G. A. 1969. Nematodes of some weeds from vegetable fields in the Kuha-Khachmas zone of *Azerbaidzhan*. Mater. Sess. Zakavk. Sov. Koord. Nauchno-Issled. Rab. Zashch. Rast., 4:92-93. (93)

The weeds include species in *Amaranthus, Atriplex, Chenopodium, Cynodon, Cyperus, Glycyrrhiza, Picris, Rubus,* and *Sorghum.* The nematodes mentioned are *Aphelenchus avenae, Aphelenchus cylindricaudatus, Aphelenchoides helophilus, Aphelenchoides olesistus, Aphelenchoides parietinus, Ditylenchus dipsaci, Ditylenchus intermedius, Paraphelenchus pseudoparietinus, Pratylenchus pratensis, Rotylenchus multicinctus, Tylenchus davainei,* and *Tylenchus filiformis.*

Kavanagh, T. 1974. The influence of herbicides on plant disease. II. Vegetables, root crops, and potatoes. Sci. Proc., Royal Dublin Soc., Ser. B, 3:251-265. (94)

The beneficial effects of weed control by herbicides on reducing virus diseases of vegetable crops carried by nematodes were reviewed.

Kemper, A. 1958. Schäden durch Wurzelgallenalchen an Freiland Kulturen. Gesunde Pflanzen, 10:219-222. (95)

In the Ruhr district of Westphalia, root-knot nematode, *Meloidogyne* sp., severely damaged carrots. *Galinsoga parviflora,* a common weed in the area, is responsible for harboring the nematode.

Kemper, A. 1959. Weitere Unkraüter als Wirtspflanzen des Wurzelgallenälchens (*Meloidogyne* sp.). Gesunde Pflanzen, 11(12):229-231. (96)

Root-knot nematode galls were found on *Atriplex* sp., *Matricaria inodora, Galinsoga parviflora, Polygonum convolvulus, Polygonum aviculare, Solanum nigrum,* and *Taraxacum* sp.

Khurramov, SH. KH. 1974. Nematodes of the weeds of sugarcane in the Surkham Dar'ya region (USSR). Byull.' Vses. Gel'mintol. K. I. Skryabina, 14:95. (97)

Kincaid, R. R. 1952. Effects of two-year rotations on nematode diseases, yield and quality of cigar wrapper tobacco. Proc., Soil Sci. Soc. Fla., pp. 78-83. (98)

The condition known as "coarse root" on tobacco is believed to be associated with attack by *Pratylenchus leiocephalus.* Rotations of crops and weed fallow showed that *Eleusine indica* increased nematode infestation. *Emelista tora* may also harbor the nematode through a fallow year.

Larsen, H. 1948. Växtföljden och växtsjukdomarna. Försök och Forskning, Sweden, 5:14, 15. (99)

Plant diseases which may be propagated by crop rotation, including fallow, were discussed. Nematode species responsible for disease increases were shown in a table with susceptible crop and weed hosts.

Laughland, J. 1947. The oat nematode. Ontario Dept. Agr., Bull. 453, 12 pp. (100)

Discussion of importance of weed control in reducing cereal root eelworm, *Heterodera major.*

Li, L.-Y. and C.-T. Shao. 1947. A preliminary list of host plants of *Heterodera marioni* in Fukien and Kwangtung. Biol. Bull., Fukien Christian Univ., 6:1-6. (101)

A list was given of 75 species of cultivated plants and weeds which have been found to be attacked by *Heterodera marioni*.

Lindhardt, K. 1957. Staengelalen (*Ditylenchus dipsaci*) i havebruget. Horticultura, 11:123-127. (102)

Ditylenchus dipsaci has been important in Denmark as a parasite of garden flowers and vegetables. Many common weeds were shown to act as reservoirs.

Linford, M. B. 1939. Attractiveness of roots and excised shoot tissues to certain nematodes. Proc., Helminthol. Soc. Washington, 6:11-18. (103)

Laboratory observations of the behavior of larvae of *Aphelenchus avenae, Heterodera marioni, Pratylenchus pratensis,* and *Rotylenchus multicinctus* in presence of growing roots showed various degrees of grouping around the root tips. Roots of *Amaranthus gracilis, Cyperus rotundus, Erigeron albidus, Euphorbia hirta, Panicum barbinode, Portulaca oleracea,* and *Vigna sinensis* were all attractive, although the last three were highly resistant to root-knot under field conditions.

Linford, M. B. 1941. Parasitism of the root-knot nematode in leaves and stems. Phytopathol., 31:634-648. (104)

Heterodera marioni infected leaves and stems of *Emilia sonchifolia* and *Portulaca oleracea*.

Linford, M. B. 1952. Pineapple diseases and pests in Mexico. FAO Plant Prot. Bull., 1:21-25. (105)

Pineapple roots in Mexico's Loma Bonita region were widely infested with *Heterodera marioni,* as were the roots of some weeds.

Linford, M. B. and F. Yap. 1940. Some host plants of the reniform nematode in Hawaii. Proc., Helminthol. Soc. Washington, 7:42-44. (106)

Rotylenchus reniformis has been found capable of egg production on 68 species of plants.

Linnman, N. 1945. Klövertrötthet och Klöver 81. Lantmannen, 29:567-569. (107)

The clover stem eelworm in middle Sweden causes a reduction in the legume content of hay in crops from the second year onwards. The eelworm thrives on *Agrostemma githago* and *Geranium dissectum*. Control of the eelworm involves destruction of these weeds.

MacLogan, D. S. 1958. Pest control in cereal crops. Scottish Agr., 37:158-161. (108)

Control measures for *Ditylenchus dipsaci* in cereal crops were recommended. Weed suppression of especially *Stellaria media, Galium aparine,* and *Dipsacus sylvestris* as well as use of resistant varieties and crop rotations were suggested.

MacMillan, H. G. 1941. Some diseases of drug plants and herbs observed in southern California. Plant Dis. Rep., 25:443-445. (109)

Heterodera marioni was found infesting the roots of deadly nightshade, *Atropa belladonna*, both in seedling boxes and in fields in southern California. Small roots of *Digitalis purpurea* were also attacked.

Mathur, V. K. and S. K. Prasad. 1974. Survival and host range of the rice root nematode, *Hirshmanniella oryzae*. Indian J. Nematol., 3:88-93. (110)

The nematode utilized the following weeds as alternate hosts: *Echinochloa crusgalli, Eclipta alba, Crogophora* sp., and *Brachiaria ramosa*.

McBride, J. M., D. M. Johns, and C. R. Carter. 1961. Relative host responses of interplanted weeds and corn to *Pratylenchus zeae* and *Pratylenchus brachyurus* (Nematoda, Tylenchida). Abstr., Phytopathol., 51:644. (111)

Roots of 33 weed species growing with maize were sampled for *Pratylenchus zeae* and *Pratylenchus brachyurus*. Weeds were considered to be non-hosts, or at best non-congenial hosts. However, possible hosts, selected on the basis of 67% or more of the root samplings yielding nemas, were:

Aster sp.
Casterbean
Crotolaria spectabilis
Helianthus sp.
Phaseolus limensis
Phlox drummondi
Sida rhombifolia
Tomato
Verbena sp.
Vinca rosea
Zinnia sp.

Miller, J. H. 1946. Notes on diseases of garden crops in Georgia in 1945. Plant Dis. Rep., 30:48-49. (112)

Heterodera marioni was found only on the one weed *Acalypha ostryaefolia*. Seven other weeds were free from infection.

Miller, P. M. and J. F. Aherns. 1969. Influence of growing marigolds, weeds, two cover crops, and fumigation on subsequent populations of parasitic nematodes and plant growth. Plant Dis. Rep., 53:642-646. (113)

Weed hosts of *Pratylenchus penetrans* and *Tylenchorhynchus claytoni* were:

Amaranthus retroflexus, Digitaria ischaemum, and *Digitaria sanguinalis*.

Minton, N. A., E. T. Tucker, and A. M. Golden. 1973. Occurrence of *Heterodera mothi*, a cyst nematode, in the United States. Plant Dis. Rep., 57:946. (114)

Heterodera mothi was recorded at Midville, Georgia, in 1972. This was the first record in the United States. It was found on the weed *Cyperus esculentus*.

Mintz, A. 1943. Additional list of plants affected by *Heterodera marioni*. Hassadeh, 24:104. (115)

The following weeds were recorded from sites in Palestine as being new hosts of *Heterodera marioni: Argyreia speciosa, Centaurea hyalolepis, Cichorium pumilum, Lathyrus ochrus, Litchi chinensis, Panicum colonum,* and *Ridolfia segetam*.

Mishkino, L. P. Nematodes of weeds in the Gorkov region. Uch. Zap. Gor'k. Gos. Pedagog. Inst., A. M. Gor'kogo, 27:153-159. (116)

Morris, H. E. and M. M. Afanasiev. 1945. Sugar beet diseases and their control in Montana. Montana Agri. Exp. Sta., Bull. 427, 22 pp. (117)

Various methods of control of *Heterodera marioni* in sugar beet, including elimination of susceptible weeds, were discussed.

Mulvey, R. H. 1957. Susceptibilities of cultivated and weed plants to the sugar-beet nematode, *Heterodera schachtii,* Schmidt, 1871, in southwestern Ontario. J. Helminthol., 31:225-228. (118)

Of the 90 plant species tested for susceptibility to *Heterodera schachtii*, only plants in the genera *Beta* and *Brassica* were heavily infested. More lightly infested plants were in the following families: Amaranthaceae, Caryophyllaceae, Chenopodiaceae, Cruciferae, Polygonaceae, and Portulacaceae.

Murant, A. F. 1970. The importance of wild plants in the ecology of nematode-transmitted plant viruses. Outlook Agr., 6:114-121. (119)

Several cases of weeds acting as hosts for nematode-borne viruses and their vectors were reported. *Longidorus elongatus*, a vector of raspberry ringspot and tomato black ring viruses, was hosted by a wide range of annual and perennial plants, especially weeds. *Trichodorus primitivus* and *Trichodorus pachydermis* were both found on *Stellaria media*. Some success was achieved in controlling the viruses by using herbicides to kill host weeds.

Nagvi, S. Q. A. and M. M. Alam. 1974. Additions to the host records of the root-knot nematode *Meloidogyne incognita*. Curr. Sci. (Bangalore), 43:564. (120)

In Uttar Pradesh, India, *Meloidogyne incognita* was found on *Amaranthus gracilis, Arundo donax,* and *Chenopodium amaranticolor*.

Naude, P. J. 1939. The control of root-knot in tobacco by means of crop rotation. Farming in S. Africa, 14:442, 460. (121)

Nolte, H. W. 1957. *Ditylenchus dipsaci* an Zwiebeln in Mitteldeutschland. Nematologica, 2:376-381, Suppl. (122)

Weeds, particularly *Stellaria media* and *Polygonum* spp., enabled the onion race of *Ditylenchus dipsaci* to persist.

Norton, D. C. 1966. Additions to the known hosts of *Meloidogyne hapla*. Plant Dis. Rep., 50:523-524. (123)

The following new weed hosts of *Meloidogyne hapla* in Iowa included:

Althaea rosea
Brassica napus
Brassica nigra
Cannabis sativa
Cardaria draba
Cirsium altissimum
Fagopyrum sagittatum
Kochia scoparia
Lepidium densiflorum
Melilotus alba
Plantago rugelii
Portulaca oleracea
Rumex altissimus
Tribulus terrestris

Oostenbrink, M. 1955. Over da waardplanten van het bietencystenaaltje, *Heterodera schachtii*, Schmidt. Versl. Meded. Plantenziektenkd., 127:186-193. (124)

New hosts of *Heterodera schachtii* found in The Netherlands were:

Arabis arenosa
Arabis turrita
Aubrietia columnea
Barbarea praecox

Brassica cernua
Cardamine impatiens
Cheiranthus alpinus
Dianthus barbatus
Dianthus plumaris
Polygonum convolvulus
Rapistrum perenne

Rumex acetosella
Rumex patientia
Sesbania exaltata

Perez, L. 1974. Weeds as hosts to nematode parasites in bananas in the Urába District. Revista Comalfi, 1:185-187. (125)

Pitman, H. A. J. 1946. Eelworm scab of potatoes. J. Dept. of Agr., Victoria, 44:481-584. (126)

Eelworm scab of potatoes due to *Heterodera marioni* caused considerable damage to potato tubers in Victoria. The most promising method of control of the nematode was bare fallow with rigorous weed eradication, since the nematode also attacked a number of weeds of pasture and arable soils.

Plakidas, G. 1936. Nematodes on alligator weed. Plant Dis. Rep., 20:22. (127)

Heterodera marioni was found on the roots and *Anguillulina dihystera* in the leaves of *Alternanthera phylloxeroides*, alligator weed. The weed occurred in strawberry fields of Louisiana.

Potter, J. W., J. L. Townshend, and T. R. Davidson. 1969. Wild and cultivated grass hosts of the southern root-knot nematode, *Meloidogyne incognita*. Nematologica, 15:29-34. (128)

Glasshouse experiments in Canada showed the following new hosts of *Meloidogyne incognita:*

Agropyron repens
Alopercurus aequalis
Agrostis perennans
Agrostis scabra

Andropogon scoparius
Echinochloa pungens microstachya
Enchinochloa pungens wiegandii
Elymus virginicus
Elymus wiegandii
Glyceria pulchella
Hystrix patula
Panicum miliaceum

Phleum alpinum
Phleum pratense
Poa palustris

Prokhorov, P. P. 1972. Nematodes of weeds on soybean fields in the Amur region (USSR). Zashch. Rast. Vred. Bolezn., pp. 42-46. (129)

The nematode fauna of 16 common weeds associated with soybean in the Upper Amur areas, Far Eastern USSR, was investigated, revealing 51 species. A list was included.

Prummel, W. 1958. *Solanum nigrum* L. as a host of the potato root eelworm, *Heterodera rostochiensis* Wollenw. Tijdschr. Planten. Ziekten., 64:142-143. (130)

Pushkarnath and B. N. R. Choudhary. 1958. Root-knot nematodes on potatoes in India. Curr. Sci. (Bangalore), 27:214-215. (131)

Coleus perviflorus acted as a wild collateral host of *Meloidogyne incognita*. New records for *Meloidogyne incognita*, *Meloidogyne incognita acrita*, and *Meloidogyne javanica* were *Achyranthus spera* and *Physalis minima*.

Putnam, D. F. and G. Thorne. 1934. Eelworm disease on oats. Canadian Plant Dis. Surv., 14:12-13. (132)

The first report of *Heterodera schachtii* in North America was recorded on oats in Ontario. *Avena fatua*, wild oats, was also susceptible.

Rangaseami, G., V. N. Vasantharajan, and R. Venkatesan. 1960. The occurrence of root-knot nematodes on sugarcane and on some weeds. Curr. Sci. (Bangalore), 29:236-237. (133)

The common weeds *Acalyphia indica*, *Gynamdropsis pentaphylla*, and *Cleome viscosa* were infected by a species of *Tylenchorhynchus* and *Meloidogyne javanica*. The nematodes caused a stunting of plants and chlorosis of leaves of sugar cane in Madras State.

Rao, Y. S., P. Israel, and H. Biswas. 1970. Weed and rotation crop plants as hosts for the rice root-knot nematode, *Meloidogyne graminicola* (Golden and Birchfield). Oryza, 7:137-142. (134)

In Cuttack, India, the following weeds from rice fields were infested with *Meloidogyne graminicola*: *Andropogan* sp., *Blumea* sp., *Echinochloa colonum*, *Echinochloa crusgalli*, *Eclipta alba*, *Eleusine indica*, *Fimbristylis miliacea*, *Grangea madraspratensis*, *Jussieua repens*, *Paspalum sanguinola*, *Phyllanthus urinaria*, and *Vandellia* sp.

Raski, D. J. and M. W. Allen. 1948. Sugar beet nematode; identification and recommendations for control of the pest in California fields. Calif. Agr., 2(11): 8, 16. (135)

Atriplex patula, *Brassica* spp., *Chenopodium album*, *Portulaca* sp., and *Rumex* sp. were reported as hosts of *Heterodera schachtii* under California conditions.

Reinmuth, E. 1936. Das Französenkraut als Wirtspflanze van *Heterodera marioni* (Cornu 1879) Goodey 1932. Z. Pflanzenkr. (Pflanzenpathol.) Pflanzenschutz, 46:6-8. (136)

Heterodera marioni was recorded for the first time on *Galinsoga parviflora* in Germany.

Reynolds, H. W. and B. Sleeth. 1951. Root-knot nematode on canaigre, Plant Dis. Rep., 35:9. (137)

Meloidogyne incognita was reported producing galls on the roots of canaigre, *Rumex hymenosepalus*, a native plant of arid areas of the American Southwest and Mexico.

Rhoades, H. L. 1964. Nutsedge, an important host of plant nematodes in Florida. Plant Dis. Rep., 48:994-995. (138)

In greenhouse studies, populations of *Belonolaimus longicaudatus, Hoplolaimus galeatus*, and *Trichodorus christiei* increased rapidly on *Cyperus rotundus*. *Meloidogyne incognita* also built up on *Cyperus rotundus*, but at a slower rate.

Riggs, R. D. and M. L. Hamblen. 1966. Additional weed hosts of *Heterodera glycines*. Plant Dis. Rep., 50:15-16. (139)

Heterodera glycines, the soybean cyst nematode, was found on the following weeds in Arkansas: *Cardamine parviflora* var. *arenicola, Cleome serrulata, Digitalis* sp., *Geranium maculatum, Linaria canadensis, Phytolacca americana,* and *Portulaca oleracea*.

Rush, M. C. 1970. Transmission of tobacco ringspot virus from native hosts to *Cucumis sativus* by *Xiphenema americanum*. Phytopathol., 60:917-918. (140)

Tobacco ringspot virus from naturally infected or inoculated *Eupatorium capilifolium, Plantago lanceolata, Rumex obtusifolius,* and *Xanthium strumarium* plants was transferred to cucumber seedlings by hand-picked *Xiphenema americanum*.

Sakchiev, A. 1971. New data on the distribution and species composition of *Meloidogyne* on vegetables, melons, and weeds in Turkmenia. Izv. Akad. Nauk Turkm. SSR, 5:49-53. (141)

Sakchiev, A. 1972. Results of the study of root-knot nematodes--parasites of vegetables, melons, and weeds in Turkmenia. Nematodnye Bolezn., pp. 135-137. (142)

Salentiny, T. 1959. Durch die Rübenrasse des Stockälchens *Ditylenchus dipsaci* hervorgerufene Schadenbilder bei einigen Unkrautarten. Nematologica, 4:142-146. (143)

Ditylenchus dipsaci damaged various weeds. Four categories of symptoms on various weeds were presented:

1) Tissue splitting and shoot malformation--*Aethusa cynapium, Avena fatua, Polygonum convolvulus, Polygonum persicaria,* and *Sonchus arvensis*.

2) Considerable distortion without noticeable lesions--*Anagallis arvensis, Convolvulus arvensis, Mercurialis annua, Sinapis arvensis,* and *Thlaspi arvense*.

3) Swellings--*Atriplex patula, Chenopodium album, Galium aparine, Plantago major,* and *Polygonum aviculare*.

4) Slight swellings--*Galeopsis tetrahit, Lepidium draba, Melandrium noctuiflorum, Papaver rhoeas, Ranunculus arvensis, Senecio vulgaris,* and *Stellaria media*.

Salentiny, T. 1957. Utersuchungen über den Wirtspflanzenkreis einer Rübenrasse von *Ditylenchus dipsaci* in Baden-Wurttemberg. Nematologica, 2:382-386 suppl. (144)

Various weeds were tested in host range studies of a race of *Ditylenchus dipsaci*.

Samad, A. G. 1960. Root-knot disease of jute. Sci. and Cult., 25:639-640. (145)

Meloidogyne javanica was found on three weeds, *Celosia argentia*, *Cleome viscosa*, and *Ageratum conyzoides*, from a field of jute. *Meloidogyne hapla* was found on *Cleome viscosa* and *Celosia argentia* only.

Sasser, J. N. 1950. Population dynamics of nematode parasites of tobacco in certain crop rotations. Abstr., Phytopathol., 41:31. (146)

Sasser, J. N. and C. J. Nusbaum. 1955. Seasonal fluctuations and host specificity of root-knot nematode populations in two-year tobacco rotation plots. Phytopathol., 45:540-545. (147)

Two weeds, *Erigeron canadensis* and *Diodia teres*, developed root-knot galls from *Meloidogyne* spp.

Sayre, R. M. 1960. A survey of certain vegetable growing areas in Ontario for the occurrence of root-knot nematode. Can. Plant Dis. Surv., 40:75-77. (148)

Five new hosts of *Meloidogyne hapla*, all weeds, are *Chenopodium glaucum*, *Daucus carota* subsp. *carota*, *Erigeron annuus*, *Potentilla intermedia*, and *Sonchus asper*.

Schuster, M. L. 1955. Sugar beet growers can starve out nematodes. Nebraska Exp. Sta. Quart., 3(3):10-11. (149)

Kochia sp. is a common weed susceptible to root-knot nematodes. A rotation to control kochia was discussed.

Schuster, M. L. and G. Thorne. 1956. Distribution, relation to weeds, and histology of sugar beet root galls caused by *Nacobbus batatiformis* Thorne and Schuster. J. Amer. Soc. Sugar Beet Technol., 9:193-197. (150)

Nacobbus batatiformis was found to persist on *Kochia scoparia* and *Chenopodium album*. Also *Opuntia tortispina*, *Opuntia fragilis*, and *Coryphantha vivipara* were found to be infected.

Seinhorst, J. W. 1957. Some aspects of the biology and ecology of stem eelworms. Nematologica, 2:355-361. (151)

Host range plants for different races of *Ditylenchus dipsaci* were mentioned. They included *Hyacinthus orientalis*, *Medicago sativa*, *Narcissus* sp., *Pisum sativum*, *Solanum tuberosum*, *Trifolium pratense*, *Trifolium repens*, and *Tulipa gesneriana*. Weeds were probably very important in maintaining a certain level of infestation.

Sethi, C. L., J. S. Gill, and G. Swarup. 1964. A note on the prevalence of *Meloidogyne* spp. in vegetable crops. Indian Phytopathol., 17:69-70. (152)

Field surveys of the occurrence of root-knot nematodes around Delhi showed that *Meloidogyne incognita*, *Meloidogyne javanica*, *Meloidogyne arenaria*, and *Meloidogyne arenaria thamesi* were present. Sometimes more than one of the species occurred on the same host. It was the first record of *Meloidogyne incognita* on *Eragrostis pilosa*.

Shlepetene, Yu. A. 1965. Nematodes of weeds. Zashch. Rast. Vred. Bolezn., pp. 74-75. (153)

Forty-four nematode species were listed that occur on seven common weeds in Lithuania, USSR.

Sieff, D. 1959. Experiment in the control of tomato eelworms. Hassadeh, 39:1011-1016. (154)

Root-knot nematodes were reported on many common weeds.

Slykhuis, J. T. 1967. *Agropyron repens* and other perennial grasses as hosts of bromegrass mosaic virus from the USSR and the United States. FAO Plant Prot. Bull., 15:65-66. (155)

Bromegrass mosaic virus (BMV) from diseased *Agropyron repens* collected in the Voronezh district of the USSR was readily transmitted to cereals and various grasses in Canada. In North America BMV has been found in Kansas and Nebraska on *Bromus inermis* or on barley, and *Poa pratensis* in close association with diseased *Bromus inermis*. In Germany a strain of BMV which infected *Lolium multiflorum* was transmitted by the nematodes *Xiphinema paraelongatum* and *Xiphinema coxi*.

Solovega, G. I. Plant nematodes of weeds in the cabbage field. Tr. Gel'mintol. Lab., 16:115-119. (156)

Soper, M. H. R. 1949. When clover fails. Farmers' Weekly, London, 31(20):47. (157)

Hieracium gronovii and other weeds served as alternative hosts to *Anguillulina dipsaci* which caused a failure of red clover in some districts of England.

Southey, J. F. and L. N. Staniland. 1950. Observations and experiments on stem eelworm *Ditylenchus dipsaci* (Kühn 1857) Filipjev 1936, with special reference to weed hosts. J. Helminthol., 24(3):145-154. (158)

Experiments in the west of England on the weed hosts of red clover, oat, teasel, phlox, and narcissus races of *Ditylenchus dipsaci* showed the importance of weeds as hosts. Infested plants included: *Capsella bursa-pastoris, Cerastium vulgatum, Cirsium arvense, Galium aparine, Matricaria* sp., *Rumex crispus, Stellaria media,* and *Veronica agrestis*.

Staniland, L. N. 1945. The occurrence of *Anguillulina dipsaci* (Kühn) on weed hosts, including new host records in fields of oats affected by tulip root. Ann. Appl. Biol., 32:171-173. (159)

Examination of weeds growing in oats suffering from "tulip root", a disease caused by *Anguillulina dipsaci*, revealed the parasite in *Arenaria serpyllifolia, Cerastium arvense, Galium aparine,* and *Stellaria media*.

Steiner, G. 1934. Root-knot and other nematodes attacking rice and some associated weeds. Phytopathol., 24:916-928. (160)

Listed were a number of nematode species found in roots of weeds and rice plants. *Heterodera marioni* attacked rice and *Echinochloa crusgalli*.

Stokes, D. E. and K. R. Langdon. 1966. A grass host plant of the citrus nematode, *Tylenchulus semipenetrans*, and other associated plants. Plant Dis. Rep., 50: 822-825. (161)

Andropogon rhizomatus, a grass in Florida, was newly reported as host for *Tylenchulus semipenetrans*.

Sudakova, I. M. 1959. Weeds as reservoir hosts of plant nematodes. Tr. Gel'mintol. Lab., 9:322-325. (162)

The author concluded that: 1) weeds are primary reservoirs for eelworms and their nematode fauna always consists of a considerable number of para rhizobionts and plant parasites of non-specific pathogenic effect; 2) weeds are reservoirs of stylet-bearing nematodes; and 3) when numerous, weeds are of importance in the accumulation and spread of infection.

Suit, R. F., E. P. DuCharme, and T. L. Brooks. 1954. Non-citrus plants in relation to spreading decline. Proc., Fla. Soil Sci. Soc., 14:182-184. (163)

The burrowing nematode, *Radopholus similis*, infested citrus plants. Attempted eradication of the nematode was frustrated by the presence of weeds on which it survived.

Tappan, W. B., R. R. Kincaid, J. R. Christie, and W. H. Thames, Jr. 1958. Shade tobacco nematode studies. Fla. Agri. Exp. Sta., Annu. Rep., p. 337. (164)

Dixie shade tobacco and *Xanthium* sp. are definite hosts of *Pratylenchus penetrans* and *Pratylenchus brachyurus*.

Taylor, C. E. and P. R. Thomas. 1968. The association of *Xiphinema diversicaudatum* (Micoletsky) with strawberry latent ringspot and arabis mosaic viruses in a raspberry plantation. Ann. Appl. Biol., 62:147-157. (165)

An outbreak of strawberry latent ringspot virus (SLRV) in Malling Jewel raspberry in Scotland coincided with the greatest abundance of the nematode vector, *Xiphinema diversicaudatum*. Arabis mosaic virus (AMV) was not detected in the crop but was present, together with SLRV in many weed species. AMV was transmitted through the seed of *Poa annua, Capsella bursa-pastoris*, and *Senecio vulgaris*, and SLRV through the seed of *Mentha arvensis*.

Thomas, P. R. 1969. Crop and weed plants compared as hosts of viruliferous *Longidorus elongatus* (de Man). Phytopathol., 18:23-28. (166)

Crops and weeds were compared as hosts for *Longidorus elongatus* and the viruses it transmits, raspberry ringspot (RRV) and tomato black ring (TBRV). Strawberry, grasses, and clovers were the most favorable hosts for the nematode. All the weeds, including *Brassica sinapis, Lamium amplexicaule, Mentha arvensis, Stellaria media, Tussilago farfara,* and *Urtica dioica,* except *Agropyron repens,* supported significantly greater populations of *Longidorus elongatus* than the fallow control. The frequency of infection of both the RRV and TBRV was generally highest among the weeds.

Thomas, P. R. 1970. Host status of some plants for *Xiphinema diversicaudatum* (Micol.) and their susceptibility to viruses transmitted by this species. Ann. Appl. Biol., 65:169-178. (167)

Forty herbaceous and woody crop and weed species were compared as hosts for the nematode *Xiphinema diversicaudatum* carrying arabis mosaic virus (AMV) and strawberry latent ring-spot virus (SLRV). One or the other of the two host-specificity experiments indicated that the nematode multiplied on relatively more woody perennials than on herbaceous crop plants or weeds. The weeds that showed increasing populations of the nematodes were *Poa annua, Stellaria media, Matricaria matricariodes,* and *Tussilago farfara. Stellaria media, Brassica sinapis, Capsella bursa-pastoris,* and *Poa annua* become more frequently infected with AMV than with SLRV, while the reverse was true of *Viola tricolor. Mentha arvensis* was a poor host for the nematode, but infection by the viruses still occurred. Signs of *Xiphinema diversicaudatum* were evident on many of the test plants, including *Poa annua, Stellaria media,* and *Veronica* sp.

Thomason, I. J. and S. D. Van Gundy. 1961. Arrowhead, *Pluchea sericea,* on the Colorado River is a host for root-knot nematodes. Plant Dis. Rep., 45:577. (168)

Meloidogyne javanica and *Meloidogyne incognita,* both important plant parasitic nematodes on crop plants in California, formed galls and egg masses on arrowhead along the Colorado River.

Townshend, J. L. and T. T. Davidson. 1960. Some weed hosts of *Pratylenchus penetrans* in Premier strawberry plantations. Can. J. Bot., 38:267-273. (169)

Pratylenchus penetrans was found in the roots of 55 weed and 7 cultivated plant species belonging to 52 genera in 23 families. The plants varied greatly in susceptibility and in suitability as food. The number of nematodes per gram of dried root ranged from 7 in *Sisymbrium altissimum* to 27,680 in *Rorippa sylvestris.* In general weeds with soft-textured roots contained more nematodes per gram of root, had more extensive lesions, and appeared more susceptible to injury than did those with hard-textured roots. Roots of perennial weeds usually had soft-textured roots and contained greater nematode populations than roots of annual weeds. The following weed species contained the greatest number of nema per gram of host root tissue:

Anthemis cotula
Capsella bursa-pastoris
Cerastium vulgatum
Chenopodium album
Cichorium intybus
Cirsium arvense
Daucus carota
Epilobium sp.
Erigeron annuus
Erigeron strigosus
Gnaphalium uliginosum
Hieracium pratense
Hypericum punctatum
Lactuca scariola
Lamium amplexicaule
Lepidium campestre
Malva neglecta
Medicago lupulina
Onopordum acanthium
Plantago major
Polygonum persicaria
Potentilla norvegica
Ranunculus abortivus
Rorippa sylvestris
Rumex crispus
Senecio vulgaris
Solidago spp.
Sonchus arvensis
Sonchus oleraceus
Stellaria media
Taraxacum officinale

Townshend, J. L. and R. R. Davidson. 1962. Some weed hosts of the northern root-knot nematode, *Meloidogyne hapla,* 1949, in Ontario. Can. J. Bot., 40:543-548. (170)

Fifty-five species of weeds were grown in pots of soil uniformly infested with *Meloidogyne hapla* for 50 days. Observations were then made on thickness of the roots, number and size of galls, and number of larvae hatching per gall when

portions of the roots were incubated for 4 weeks. Similar observations were made on the same weeds in an infested field. The following 41 species proved to be hosts, 23 as new hosts:

Alliaria officinalis	*Daucus carota*	*Polygonum aviculare*
Amaranthus retroflexus	*Epilobium* sp.	*Polygonum convolvulus*
Anthemis cotula	*Galinsoga ciliata*	*Polygonum persicaria*
Arctium minus	*Hieracium aurantiacum*	*Rumex crispus*
Artemisia biennis	*Hieracium pratense*	*Sisymbrium altissimum*
Barbarea vulgaris	*Hypericum punctatum*	*Solanum dulcamara*
Brassica kaber	*Lactuca scariola*	*Sonchus arvensis*
Capsella bursa-pastoris	*Leonurus cardiaca*	*Stellaria media*
Cerastium vulgatum	*Lychnis alba*	*Taraxacum officinale*
Chelidonium majus	*Medicago lupulina*	*Thlaspi arvense*
Chrysanthemum leucanthemum	*Nepeta cataria*	*Tragopogon porrifolius*
Cichorium intybus	*Plantago lanceolata*	*Veronica arvensis*
Cirsium arvense	*Plantago major*	*Veronica peregrina*
Cirsium vulgare		*Vicia villosa*

Tulaganov, A. T. 1954. (Results and prospects of investigations into the nematodes of cultivated plants in Uzbekistan.) Tr. Probl. Temat. Soveshch. Akad. Nauk. SSSR Zool. Inst., 3:161-170. (171)

Literature on plant parasitic and soil nematodes for Uzbekistan since 1930 was reviewed. The results listed 111 plant parasitic and soil nematodes. Plants examined in the Fergana Valley showed 60 species of crops and weeds to be infested with *Heterodera marioni*. A list of the hosts was included.

Upchurch, R. P., F. L. Selman, and H. L. Webster. 1970. Utility of maintained weed infestations under field conditions. Weed Sci., 18:206-214. (172)

Eight weed species were used to evaluate various herbicides. Distinctive patterns of nematode infestation were observed as a function of weed species. For example, the lesion nematode *Pratylenchus zeae* was encouraged by *Digitaria ischaemum* and *Eleusine indica*; the stunt nematode *Tylenchorhynchus claytoni* was found near *Xanthium pennsylvanicum* and *Ambrosia artemisifolia*; the spiral nematode *Helicotylenchus mannus* was found in the presence of *Ambrosia artemisifolia* and *Ipomoea hederacea*; the stubby root nematode *Trichodorus christici* was encouraged by *Digitaria ischaemum*; and the ring nematode *Criconemoides* spp. was present near *Digitaria ischaemum, Eleusine indica,* and *Xanthium pennsylvanicum.*

Valleau, W. D. and E. M. Johnson. 1946. Tobacco diseases in Kentucky, 1946. Plant Dis. Rep., 30:465-467. (173)

Pratylenchus pratensis was abundant in tobacco roots of several burley varieties in brown root-rot plots and in several unspecified grasses, legumes, and weeds at Lexington, Ky.

Van Der Meer, F. A. 1965. Investigations of current viruses in the Netherlands. II. Further observations on spoon leaf virus, transmitted by the nematode *Longidorus elongatus*. Netherlands J. Plant Pathol., 71:33-46. (174)

Spoon leaf virus is the causative agent of the disease in red currant, some raspberry varieties, and a number of weed species, which is transmitted by *Longidorus elongatus*. The virus was transmitted experimentally, using hand-picked *Longidorus elongatus*, to *Chenopodium quinoa*, sugar beet, spinach, *Stellaria* sp. and currant seedlings.

Vanterpool, T. C. 1948. *Ditylenchus radicicola* (Greeff) Filipjev, a root-gall nematode new to Canada found on wheat and other Gramineae. Sci. Agr., 28:200-205. (175)

Two new hosts of the root-gall nematode *Ditylenchus radicicola* (*Anguillulina radicicola*) were recorded. They are *Agropyron smithii* and *Agropyron cristatum*. Both species were found to be infested by the nematode in the field and in greenhouse studies in Saskatchewan, Canada.

Videgard, G. 1967. Havre cystnematoden angriper all varsäd. Växtskyddsnotiser, 31:88-90. (176)

Heterodera avenae, mainly a parasite of spring sown cereals in Sweden, was also found on *Avena fatua* and some other grasses.

Vinduska, L. 1967. Weeds and the sugar beet eelworm *Heterodera schachtii* Schmidt. Ochr. Rostl., 3-219-224. (177)

Heterodera schachtii was found to be hosted by 17 weed species including *Chenopodium album* and *Galinsoga parviflora*. The nematode preferred sugar beet, winter rape, fodder beet, kale, and kohlrabi to *Sinapis arvensis, Thlaspi arvense, Atriplex nitens, Chenopodium glaucum*, and other weed species.

Walker, J. C. 1927. Diseases of cabbage and related plants. U. S. Dept. Agr., Farmer's Bull. 1439, 30 pp. (178)

Anthemis cotula, Cardiospermum halicácabum, Passiflóra incarnata, Portulaca oleracea, and *Richardia scabra* were susceptible to *Heterodera marioni*, a nematode responsible for root-knot on cabbage in the U.S.

Walton, C. L. 1938. The origin of infestation by the oat strain of the eelworm *Anguillulina dipsaci* (Kühn). Res. Sta. Rep., Long Ashton, pp. 85-92. (179)

Continued infestation of *Anguillulina dipsaci* was attributed to weeds such as: *Brassica sinapis, Convolvulus arvensis, Galium aparine*, and *Veronica agrestis*.

Wilson, G. F. 1937. The root-knot eelworm, *Heterodera marioni* (Cornu) Goodey, and its relation to plants growing outdoors in the British Isles and in certain European countries. J. Roy. Hort. Soc., 62:336-346. (180)

Three species of weeds were listed that have been recorded as hosts of *Heterodera marioni* under field and garden culture conditions in the British Isles.

Winslow, R. D. 1954. Provisional lists of host plants of some root eelworms (*Heterodera* spp.). Ann. Appl. Biol., 41:591-605. (181)

Heterodera schachtii infected nearly all members of the Cruciferae tested as well as plants in the families Amaranthaceae, Caryophyllaceae, Chenopodiaceae, Labiatae, Phytolaccaceae, Polygonaceae, Scrophulariaceae, and Tropaeolaceae.

Heterodera cruciferae infected nearly all Cruciferae tested and a few Labiatae.

Heterodera trifolii and *Heterodera schactii* var. *galeopsidis* attacked members of the Carophyllaceae, Labiatae, Leguminosae, Polygonaceae, and Scrophulariaceae.

Heterodera rostochiensis cysts were found only on *Solanum* spp. and *Lycopersicum* spp.

Heterodera carotae only attacked *Daucus* spp.

Heterodera humuli only attacked *Humulus, Cannabis,* and *Urtica*.

Heterodera göttingiana only attacked *Lathyrus, Lens, Pisum,* and *Vicia*.

Heterodera major attacked a variety of grasses.

Yeates, G. W., J. D. Stout, D. J. Ross, M. E. Dutch, and R. F. Thomas. 1976. Long-term effects of paraquat-diquat and additional weed control treatments on some physical, biological, and respiratory properties of soil previously under grass. New Zealand J. Agri. Res., 19(1):51-61. (182)

The abundance and diversity of the nematode fauna declined in plots treated with herbicides every 3 weeks for 6 years in New Zealand.

Young, P. A. 1946. Tomato disease in Texas. Texas Agri. Exp. Sta., Circ. 113, 66 pp. (183)

Fallowing was not recommended for control of *Heterodera marioni* in tomatoes because it did not control root-knot susceptible weeds.

Young, R. A., D. C. Torgeson, and C. G. Anderson. 1950. Meadow nematodes (*Pratylenchus* sp.) on mazzard cherry and forage plants and weeds in nursery rotations. Plant Dis. Rep., 34:230-231. (184)

Pratylenchus sp. was found on *Centaurea cyanus, Polygonum convolvulus, Cardamine breweri, Stellaria media, Anthemis cotula, Chenopodium album,* and *Brassica campestris* in field tests in Oregon.

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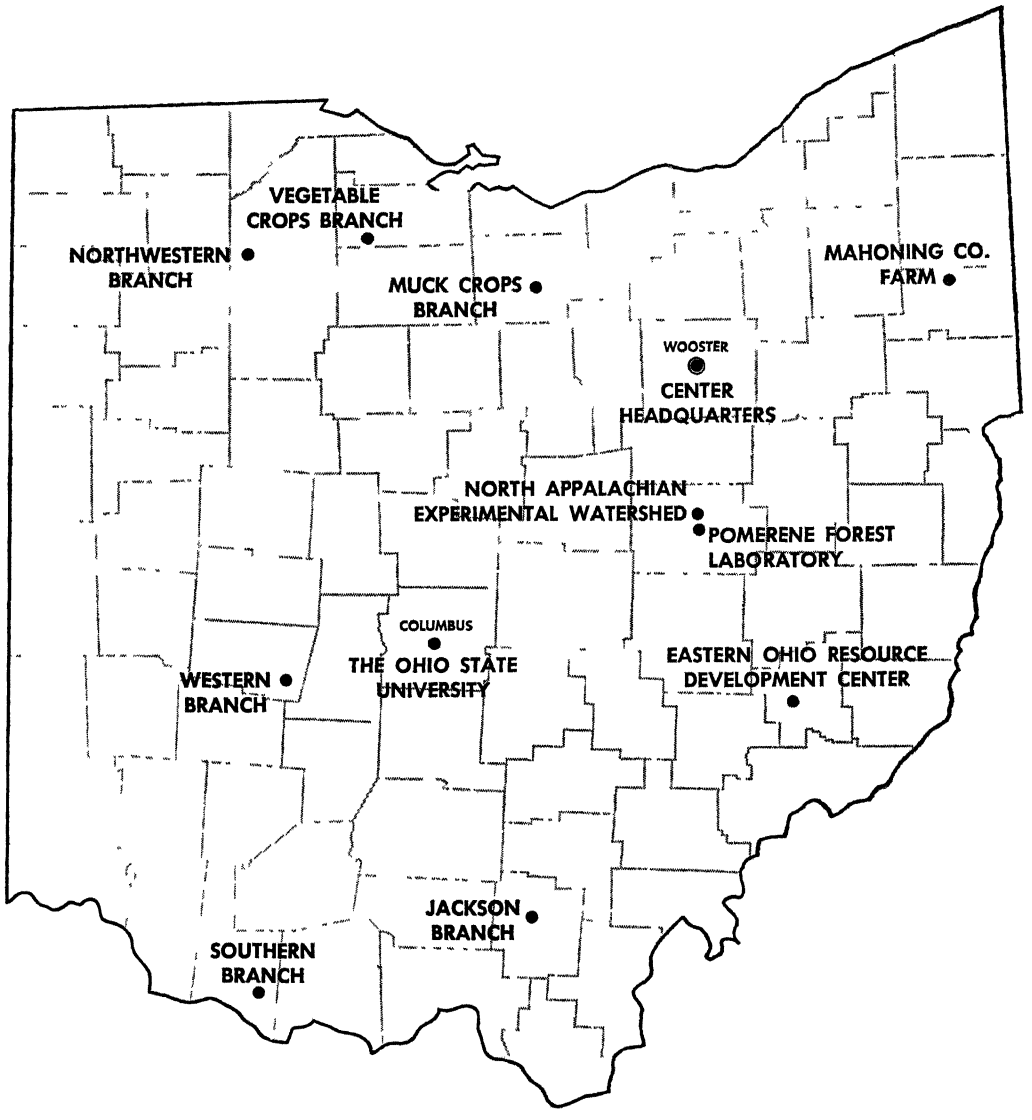

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